

RESEARCH PAPER

Vascular Plants of Makok Mountain in (Mountain Region-Rowanduz District) Kurdistan Region/Iraq.

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ABSTRACT:

A study was conducted on the first comprehensive survey of vascular plants in the Makok Mountain. Surveyed Area located on the northwest of Sulaymaniyah governorate Iraqi Kurdistan Region, in the botanical physiographic mountain Rowanduz district, as a part of the mountain forest region. Surveyed area is situated about 120 km North of Sulaymaniyah city. The period of Field work were conducted from spring 2021 to spring 2022. Over 2000 plant taxa were collected. As a results, 351 plant taxa from 65 families and 243 genera were determined and identified. The 5 largest families in this study area such as Asteraceae (50 taxa: 32.05 %), Fabaceae (35 taxa: 22.44 %), Lamiaceae (28 taxa: 17.95 %), Poaceae (23 taxa: 14.74%), and Apiaceae (20 taxa: 12.82 %).

KEY WORDS: Vascular Plants, Plant Surveying, Makok Mountain-Kurdistan/Iraq.

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1.INTRODUCTION :

Botanical survey is important to investigate the vegetation cover at a certain area and to know the families, genus and species of plants and further information about plant density, frequency and the area covered with plants. Also, to investigate all types of plants such as the medicinal plants, wild plants, cultivated plants, pasture plants and those used to control desertification phenomenon. On an area basis, herbs contribute significantly to the world's land surface and an important share is devoted to grazing. The Vegetation structure is as important as climate in shaping ecosystem functioning in study region. Maintaining and enhancing the vegetation cover and species richness, particularly grasses could reduce the adverse effects of climate change on ecosystem functioning in these ecosystems(Gaitan et al., 2014).

Biodiversity refers to the wide range of living forms and habitat kinds found on Earth. Today, the world habitat degradation and fragmentation have become major drivers in the extinction of local vascular flora. Local vascular flora is an essential component of the natural food chain. The extinction of a species in the local flora can have a rapid impact on a whole ecosystem (Hillaert et al., 2020). The finding of indigenous flora is also required for the implementation of the national plant biodiversity conservation strategy (Urgamal et al., 2019).

Iraq is one of the countries rich in wild plants and considered to be an essential national wealth in the region. Taxonomic studies of this wealth help to know and identify the species and their numbers (Al-Rawi., 1964). Taxonomic studies have taken good steps in different Iraqi areas. The research has been done through numerous studies and various excursions(Zohary, 1946). The Northern and North-Eastern regions of Iraq have always

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been and remain the focus of attention of researchers. Although many taxonomists have worked in the region, scientific sources are very limited to complete the Iraqi flora (Rashed, 1990).

Many researchers have studied the region, and they have consistently attempted to complete the Iraqi flora despite the fact that scientific sources are sparse. The Previous studies identical to this one have been undertaken in many districts and locations, including: Surveyed of vascular plants of Sinjar Mountain and were determined 638 plant species (Khalaf, 1980). Also surveyed for the vascular plants in Piramagrun Mountains and determined 542 plant species (Faris, 1983). Surveyed for the Vascular plants of Haibat Sultan Mountain and the adjacent areas and determined 325 plant species (Haedar, 2003). Survey for vascular plants of Darband Gomaspan and the Adjacent Areas in Erbil Province (Ahmed, 2010). A Surveyed for Vascular Plants of Hawraman Region in Kurdistan/Iraq, Were identified 951 plant species (Ahmad, 2013). Surveyed of the Vascular plant taxa of Hujran Basin-Erbil/Iraq; this study adds 57 families, 200 genera and 288 plant species were identified (Hameed, 2016). Surveyed for plant biodiversity and Ethnobotanical properties of various plants in Choman-Erbil/Iraq, identified 61 families, 182 genera and 282 plant species (Darwesh, 2017). A Surveyed for Vascular Plants of Bani Harir Mountain (MRO) Kurdistan region/Iraq, Were identified 73 families, 275 genera and 412 plant species (Saeed, 2021).

The principal goals of this work are to thoroughly survey the vascular plants of Makok Mountain, one of the most diversified areas in the (MRO) Region, which has not been studied adequately. The present work aimed to explore the plant diversity throughout the elevation change in the Makok area, Northern Iraq, and contribute some ecological notes with specimens studied found in some Iraqi herbaria to add a small part to the flora of Iraq and determine families, genera, and species in the area. Another aim is to build and maintain new and larger herbaria, especially for researchers and academic studies.

2. LOCATION AND GEOLOGY OF SURVEYED AREA

Makok Mountain, one of the surveyed areas belongs to Ranya district, located on the

Northwest of Sulaymaniyah governorate in Iraqi Kurdistan Region in the botanical physiographic Mountain Rowanduz district, as a part of the mountain forest region according to Guest division (1966A), as showed in **Figure 1**. Makok Mountain is situated about 120 km North of Sulaimani city between latitudes $36^{\circ}28'85''$ - $36^{\circ}17'19''$ N and longitudes $44^{\circ}75'67''$ - $44^{\circ}45'24''$ E. Its altitudes range from as low as 600 m near Hajiawa city to 1820 m at the top of Makok Mountain. This area is located in Ranya district and surrounded by mountains, rivers, a fertile plain, hills, doli shawre valleys and Dukan Lake.

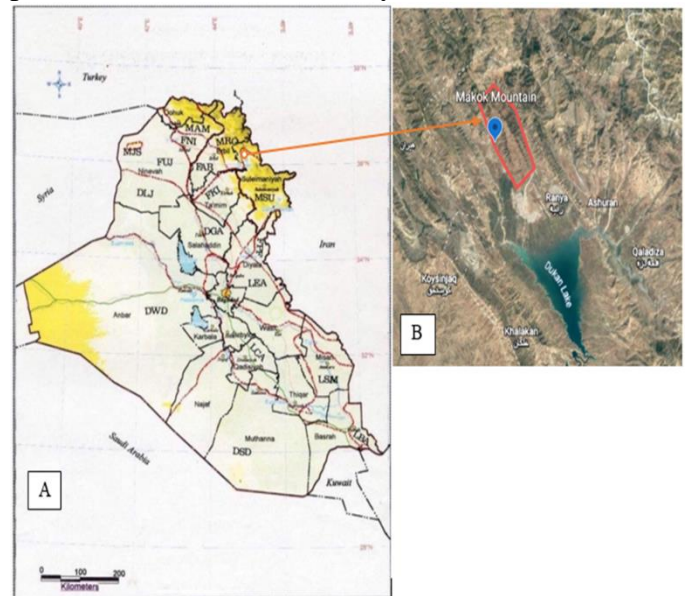


Figure 1. A-Physiographic Regions Map of Iraq (Guest, 1966A) B-The Location of the studied Area.

The studied area is a part of the North-Western Zagros Fold-thrust Belt and is structurally located at the boundary between the High Folded-Thrust zone and the Imbricated zone (Jassim and Goff, 2006). The exposed rocks are of Jurassic and Cretaceous ages, and the covered part is represented by alluvial fans and little zabs, Dukan Lake deposits, where the alluvial sediments cover Ranya area, which consists of clay, silt, sand, and gravel. The Jurassic rocks are cropping out in Doli shawre and in the core of most of the Ranya and Makok anticlines, As showed in **Figure 2** and represent by in ascending order; Sarmord Formation (Hauterivian-Barremian), Qamchuqa Formation (Early Aptian-Early Cenomanian), Kometan Formation, Sarki Formation (early Jurassic) and Sehkanian Formation (Early Jurassic). It is worthy to mention that almost all Jurassic rocks are rich in organic materials and black in color, and act as source rock for most of

the oil reservoirs in the Kurdistan region and Iraq (Omar et al., 2015).

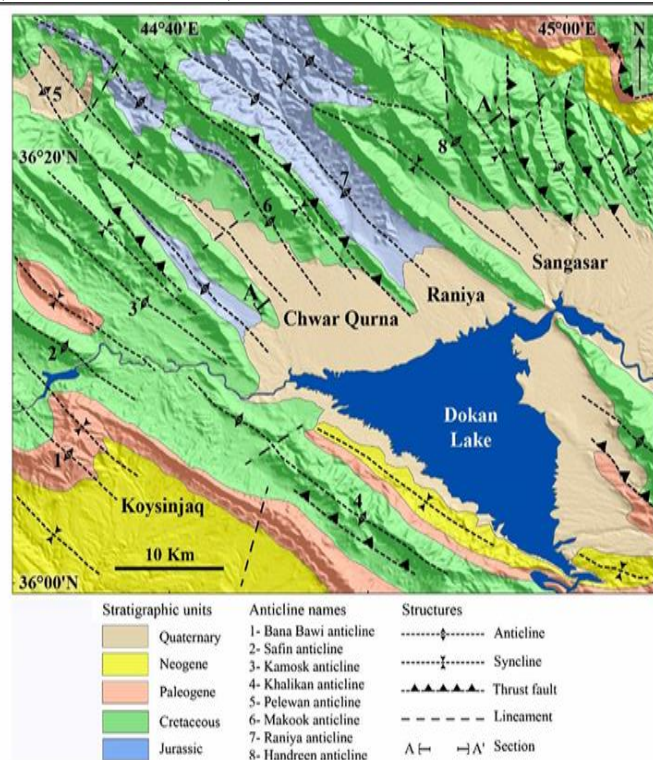


Figure 2. Geological map of the Bitwen region (Ranya district) and surrounding areas (modified from GEOSURY 1997).

3. MATERIALS AND METHODS:

3.1. The Materials

Plant samples are the work's materials, which were gathered and dried using typical herbarium techniques (Bridson and Forman, 1998, Maden, 2004). Through the field trips about 2000 plant specimens were collected from the Mountain surface and surrounding in more than 53 field trips.

All specimens collected during the field study were identified, numbered, classified, and deposited in the herbarium of Education College - Biology department, Salahaddin University-Erbil/Iraq. Field trips were conducted from Spring 2021 to Spring 2022. Plant taxa were collected from various habitat types and photographed. Also; GPS coordinates and the elevations for each taxon were recorded.

3.2. The Methods

All plant samples or parts (for tree and shrubs) were collected from the fields and pressed in wooden trellis and most of the taken species were photographed in their habitat and then morphologically identified using the following references. As the main flora works: Flora of Iraq by (Townsend and Guest, 1974) vols 3, (Townsend and Guest, 1966-1985) vols 1, 2, 3, 4, 8, 9, (Ghazanfar and McDaniel, 2016), and (Bor and Guest, 1968), (Khalaf, 1980), (Faris, 1983), (Haedar, 2003), (Ahmed, 2010), (Ahmad, 2013), (Hameed, 2016), (Darwesh, 2017), (Saeed, 2021). Flora of Iranica by (Rechinger, 1963) and Flora of Turkey by (Davis, 1965) and (Güner et al., 2012) were used intensely. The surveyed area is divided into 6 divisions, generally for partition based on the ownership of the mountain by each local district. Section 1 included Gullan Village. Each of, Bardanga, Daraban, Qalla saida, Hajiawa, and Betwata, are the represented Sections 2, 3, 4, 5, 6, respectively. Sections' longitude and latitude are also included in (Table 1).

Table 1. Geographical positions of the surveyed area

Section 1	Makok mountain, Gullan Village, Altitude: 600-1820 m, Latitude: 36° 24'28.57" N, Longitude 44°40'41.17" E.
Section 2	Makok mountain, Bardanga Village, Altitude: 550-1750 m, Latitude: 36° 23'30.58" N, Longitude 44°42'38.39" E.
Section 3	Makok mountain, Daraban Village, Altitude: 500-1764 m, Latitude: 36° 21'40.12" N, Longitude 44°44'29.34" E.
Section 4	Makok mountain, Qallasaida Village, Altitude: 574-1630 m, Latitude: 36° 20'23.46" N, Longitude 44°45'50.25" E.
Section 5	Makok mountain, Hajiawa town, Altitude: 600-900 m, Latitude: 36° 15'13.15" N, Longitude 44°46'15.04" E.
Section 6	Makok mountain, Betwata Village, Altitude: 552-1764 m, Latitude: 36° 19'53.12" N, Longitude 44°41'53.84" E.

3.3. Abbreviations

The following abbreviations are used in the text and in the Makok Mountain floristic list: (*) for taxa discovered for the first time during this study for the (MRO) district, an: annual plants, pe: perennial plants, bi: biennial plants, Tr: Tree, Sh: Shrub, Fe: Fern, based on plant distribution, (T) represents Turkey, (I) represents Iran, (S) represents Syria, and (M) for other mountain districts in Kurdistan-Iraq, Vo: Plant specimen voucher number.

4. RESULTS AND DISCUSSIONS

In this study, a total of 351 plant taxa belonging to 243 genera and 65 families were identified. (**Table 2**) and (**Figure 3**) it shows the largest 5 families in the region were: Asteraceae (50 taxa), Fabaceae (35 taxa), Lamiaceae (28 taxa), Poaceae (23 taxa), and Apiaceae (20 plant taxa). In this study Pteridophytes include 2 families, 3 genera and 3 plant taxa. The total 351 plant taxa belonging to Spermatophyta were recorded 63 families, 240 genera, and 348 plant taxa, as showed from (**Table 3**). According to Groups of Spermatophyta were recorded 1 families, 2 genera and 2 plant species from Gymnosperme and 62 families, 238 genera and 346 plant species from Angiosperme, as showed from (**Table 4**).

The plants were collected during the plant surveying process, and their results differed depending on family numbering, genus numbering, and taxa numbering from one section of the study area to the next, which is dependent on some factors such as the researcher's attempt, capability, biological factor, and environmental factor of the study area (McCain and Grytnes, 2010).

All collected and identified plants were new records in the examined region, The largest life cycle of identified 351 vascular plant species are herbs with 322 (91.74 %) plant taxa, of these 155 (48.14 %) of which are annual: 10 (3.11 %) of which are biennial: 157 (48.76 %) of which are perennial, as showed from (**Table 5**). The others; 10 shrubs (2.85 %), 16 trees (4.56 %) and 3 ferns (0.85 %), as showed from (**Table 6**). See the flora list in the addendum.

Table 2. Five largest Families with their taxa number.

	Family	Taxa number	Ratio (Total Flora)	Ratio (five largest family)
1.	Asteraceae	50	32.05 %	14.25 %
2.	Fabaceae	35	22.44 %	9.97 %
3.	Lamiaceae	28	17.95 %	7.98 %
4.	Poaceae	23	14.74 %	6.55 %
5.	Apiaceae	20	12.82 %	5.70 %
	Total	156	44.44 %	100.00 %

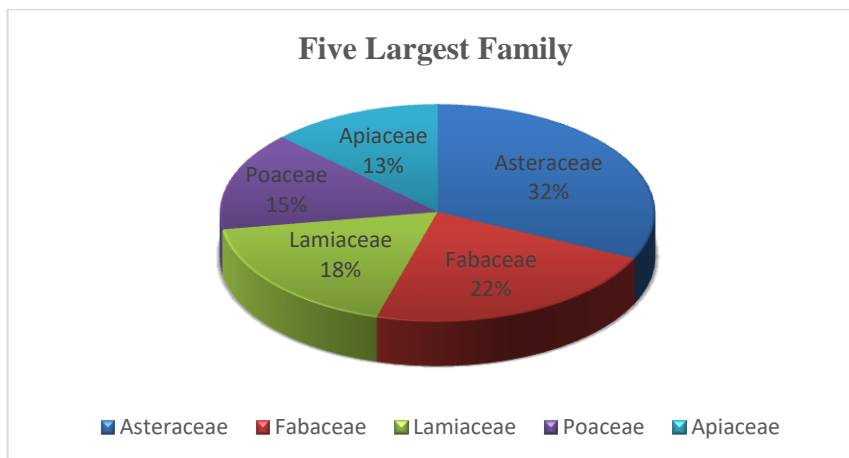


Figure 3. Five largest Families with their Ratio.

Table 3. Plant groups according to their taxa.

	Number of Families	Number of Genera	Number of taxa
Pteridophyta	2	3	3
Spermatophyta	63	240	348
Total	65	243	351

Table 4. Groups of Spermatophyta.

	Number of Families	Number of Genera	Number of Species
Angiosperme	62	238	346
Gymnosperme	1	2	2
Total	63	240	348

Table 5. Plant duration:

Life cycle	taxa number	Ratio
Annual herbs	155	48.14 %
Biennial herbs	10	3.11 %
Perennial herbs	157	48.76 %
Total	322	100.00 %

Table 6. Plant habit:

Life spans	taxa number	Ratio
Herb	322	91.74 %
Shrub	10	2.85 %
Tree	16	4.56 %
Fern	3	0.85 %
Total	351	100.00 %

The following are the Systematic Vascular Plants List:**1. ACANTHACEAE****1. *Acanthus dioscoridis* L.**

(Pe, T, S, I, M), Section, 1, 2, 3, (Vo-520)

2. ACERACEAE**2. *Acer monspessulanum* L.**

(Tr, I, T, S, M), Section, 1, 2, 3, 4, 6, (Vo-339)

3. ADIANTACEAE**3. *Adiantum capillus-veneris* L.**

(Fe, T, S, I, M), Section, 1, 3, 4, 6, (Vo- 406)

4. *Cheilanthes persica* (Bory) Mett. Kuhn.

(Fe, I, T, M), Section, 1, 2, 3, 4, 6, (Vo- 708)

4. ALLIACEAE**5. *Allium akaka* Gmelin.**

(pe, I, T, M), Section , 1, 2, 3, (Vo-166)

6. *Allium jesdianum* Boiss. & Buhse.

(pe, T, I, M), Section, 1, 2, 3, (Vo-231)

7. *Allium rotundum* L.

(pe, S, T, I, M), Section, 1, 2, 3, (Vo- 753)

8. *Allium stamineum* Boiss.

(pe, T, I, M), Section, 1, 2, 3, 4, (Vo-233)

9. *Allium paniculatum* L.

(pe, I, T, M), Section, 1, 2, (Vo-710)

5. AMARANTHACEAE**10. *Amaranthus albus* L.**

(an, S, T, I, M), Section, 5, 6, (Vo-1420)

11. *Amaranthus blitoides* S. Wats.

(an, T, M), Section, 5, (Vo-551)

12. *Amaranthus retroflexus* L.

(an, S, T, I, M), Section, 1, 2, 3, (Vo- 547)

13. *Brassia scoparia* (L.) A. J. Scott

(an, S, T, I, M), Section, 1, 2, 3, 4, (Vo- 757)

14. *Chenopodium album* L.

(an, T, M), Section, 1, 2, 3, 4, (Vo-546)

15. *Chenopodium vulvaria* L.

(an, T, I, M), Section, 1, 3, (Vo-574)

6. AMARYLLIDACEAE**16. *Narcissus tazetta* L.**

(pe, I, T, M), Section, 5, (Vo-35)

7. ANACARDIACEAE**17. *Pistacia eurycarpa* Yalt.**

(Tr, S, T, I, M), Section, 1, 2, 3, 4, 5, (Vo- 203)

18. *Pistacia khinjuk* Stocks.

(Sh, T, S, I, M), Section, 1, 2, 3, 4, 5, (Vo- 4)

8. APIACEAE**19. *Ammi majus* L.**

(an, I, S, T, M), Section 1, 2, 3, 4, 5, (Vo-548)

20. *Artemisia squamata* L.

(an, T, S, I, M), Section 1, 2, (Vo- 468)

21. *Conium maculatum* L.

(bi, T, S, I, M), Section 1, 2, 3, 4, (Vo-1919)

22. *Eryngium campestre* L.

(pe, S, T, I, M), Section, 1, 2, 3, (Vo-214)

23. *Eryngium creticum* Lam.

(pe, S, I, T, M), Section, 1, 2, 3, 5, 6, (Vo-388)

24. *Falcaria vulgaris* Bernh

(bi, I, S, T, M), Section, 1, 3, 4, 6, (Vo- 447)

25. *Ferula communis* L.

(pe, S, T, I, M), Section, 1, 2, 3, 5, 6, (Vo-230)

26. *Ferula haussknechtii* Wolff & Rech.f.

(pe, S, T, I, M), Section, 2, 3, 6, (Vo-222)

27. *Foeniculum vulgare* Mill.

(pe, T, S, I, M), Section, 1, 2, 3, 4, 5, (Vo-751)

28. *Hellenocarum ampliflorum* Boiss. & Hausskn.

(pe, I, S, T, M), Section, 1, 2, 3, (Vo-149)

29. *Lagoecia cuminoides* L.

(an, T, S, I, M), Section, 2, 3, 4, 6, (Vo- 474)

30. *Malabaila secacul* (Mill.) Boiss.

(pe, S, T, I, M), Section, 1, 2, 3, 4, (Vo-578)

31. *Pimpinella olivieri* Boss.

(bi, T, I, M), Section, 1, 2, 3, 4, 5, 6, (Vo-132)

32. *Pimpinella peregrina* L.

(bi, T, I, M), Section, 1, 3, 5, 6, (Vo-579)

33. *Prangos ferulacea* (L.) Lindl.

(pe, I, M), Section, 2, 6, (Vo-1521)

34. *Scandix pectin-veneris* L.

(an, S, T, I, M), Section, 1, 2, 3, 5, 6, (Vo-117)

35. *Scandix stellata* Banks & Sol.

(an, I, S, T, M), Section, 1, 3, (Vo- 411)

36. *Smyrniium cordifolium* Boss.

(bi, S, I, T, M), Section, 1, 2, 3, 5, 6, (Vo-58)

37. *Torilis leptophylla* (L.) Rchb.

(an, S, T, I, M), Section, 1, 2, 5, (Vo- 583)

38. *Turgenia latifolia* (L.) Hoffm.

(an, S, M), Section, 1, (Vo- 420)

9. APOCYNACEAE**39. *Nerium oleander* L.**

(Sh, T, S, I, M), Section, 2, 5, 6, (Vo- 12)

10. ARACEAE**40. *Arum conophalloides* Kotschy ex Schott.**

(pe, T, M), Section, 1, 2, 5, 6, (Vo- 53)

41. *Biarum carduchrum* (Schott) Engl.

(pe, S, T, I, M), Section, 1, 3, 4, 5, (Vo- 34)

42. *Eminium spiculatum* (Blume) Schott.

(pe, T, S, M), Section, 1, 2, 3, (Vo- 71)

11. ARISTOLOCHIACEAE**43. *Aristolochia bottae* Jaub. & Spach.**

(pe, I, S, M, T), Section, 1, 2, 5, 6, (Vo-108)

12. ASPARAGACEAE**44. *Asparagus verticillatus* L.**

(pe, T, M, S), Section, 1, 2, 3, (Vo- 1076)

45. *Bellevalia kurdistanica* Feinbrun.

(pe, I, T, M), Section, 1, 2, (Vo- 78)

46. *Muscari comosum* (L.) Mill.

(pe, S, T, M, I), Section, 1, 3, 5, (Vo- 381)

47. *Muscari longipes* Boiss.

(pe, S, T, M, I), Section, 1, 2, 3, 5, 6, (Vo- 197)

48. *Muscari neglectum* L.

(pe, T, M, I, S), Section, 1, 2, 3, (Vo- 250)

49. *Ornithogalum brachystachys* K.Koch.

(pe, T, S, M, I), Section, 1, 2, 3, (Vo- 74)

50. *Ornithogalum kurdicum* Bornm.

(pe, T, M, I), Section, 1, 2, 5, 6, (Vo- 716)

- 51. *Ornithogalum persicum*** Hausskn. ex Bornm.
(pe, S, I, M, T), Section, 1, 2, 5, 6, (Vo- 341)
- 13. ASPHODELACEAE**
- 52. *Eremurus spectabilis*** M.Bieb.
(pe, I, S, T, M), Section, 2, 3, (Vo- 232)
- 14. ASPLENIACEAE**
- 53. *Cetarach officinarum*** DC.
(Fe, T, M, I, S), Section 1, 2, 3, 5, 6, (Vo- 656)
- 15. ASTERACEAE**
- 54. *Achillea aleppica*** DC.
(pe, I, M, S) Section, 1, 2, 3, 4, 6, (Vo-334)
- 55. *Achillea filipendulina*** Lam.
(pe, I, M, S) Section, 1, 2, 3, (Vo-1532)
- 56. *Anthemis haussknechtii*** Boiss. & Reut.
(an, S, I, M) Section, 1, 2, 5, 6, (Vo-259)
- 57. *Anthemis pseudocotula*** Boiss.
(an, S, I, M) Section, 1, 2, 3, (Vo-65, 66)
- 58. *Artemisia absinthium*** L.
(pe, T, M, S), Section, 1, 2, (Vo-508)
- 59. *Calendula arvensis*** M.Bieb.
(an, T, M, I), Section, 3, 4, 5, (Vo- 464)
- 60. *Carduus pycnocephalus*** L.
(an, T, S, M, I), Section, 3, 4, (Vo-209)
- 61. *Carlina corymbosa*** L.
(pe, S, M, I), Section, 1, 2, 3, 4, (Vo-5)
- 62. *Carthamus dentatus*** Vahl.
(an, I, T, M), Section, 1, 2, 5, 6, (Vo-860)
- 63. *Carthamus lanatus*** L.
(an, T, M, I), Section, 1, 2, 3, (Vo-1418)
- 64. *Centaurea behen*** L.
(pe, I, M), Section, 1, 2, 3, (Vo-356)
- 65. *Centaurea iberica*** Trev. Ex Spreng.
(pe, S, T, M, I), Section, 1, 2, 3, 4, (Vo- 89)
- 66. *Centaurea nigra*** L.
(pe, I, S, M, T), Section, 1, 2, (Vo-758)
- 67. *Centaurea regia*** Boiss.
(pe, T, M, I), Section, 1, 3, (Vo-1411)
- 68. *Centaurea solstitialis*** L.
(pe, T, M, I), Section, 1, 2, 3, (Vo-196)
- 69. *Centaurea urvillei*** DC.
(pe, I, T, M), Section, 1, 3, 6, (Vo- 681)
- 70. *Centaurea virgata*** Lam.
(pe, I, T, M), Section, 1, 3, 5, 6, (Vo-1440)
- 71. *Chondrilla juncea*** L.
(pe, S, T, I, M), Section, 1, 2, 4, (Vo- 1440)
- 72. *Cichorium intybus*** L.
(an, S, T, M, I) Section, 2, 3, 4, 5, 6, (Vo- 455)
- 73. *Cichorium pumilum*** Jacq.
(an, I, M, S, T) Section, 1, 3, 4, 5, 6, 7, (Vo- 460)
- 74. *Crepis foetida*** L.
(an, S, M, I), Section, 1, 2, 3, 4, 10, 11, (Vo-587)
- 75. *Crepis sancta*** (L.) Bornm
(an, I, S, M), Section, 1, 4, 5, 6, 9, (Vo- 433)
- 76. *Echinops sp.***
(Pe, I, M), Section, 1, 2, 3, 4, 5, (Vo-7)
- 77. *Echinops spinosissimus*** L.
(Pe, I, M), Section, 1, 2, 3, 4, 5, 6, (Vo-8)
- 78. *Erigeron acris*** L.
(Pe, T, M, I), Section, 1, 2, 3, 4, 5, (Vo-862)
- 79. *Erigeron sumatrensis*** L.
(Pe, I, M, T), Section, 1, 2, 3, 4, (Vo-19)
- 80. *Filago anatolica*** (Boiss. & Heldr.) Chrtek & Holub
(an, S, T, M), Section, 1, 2, (Vo-1241)
- 81. *Filago pyramidata*** L.
(an, T, M, S), Section, 1, 2, 3, (Vo-701)
- 82. *Gundelia tournefortii*** L.
(pe, I, T, S, M), Section, 1, 2, 3, 4, 5, 6, (Vo- 93)
- 83. *Lactuca serriola*** L.
(bi, T, I, M, S), Section, 2, 5, 6, (Vo- 419)
- 84. *Lapsana communis*** L.
(an, S, M, I, T), Section, 1, 3, 5, 6, (Vo-509)
- 85. *Notobasis syriaca*** (L.) Cass.
(an, S, T, I, M), Section, 1, 2, 3, 4, 5, 6, (Vo- 1125)
- 86. *Onopordum carduchorum*** Bornm. & Beauverd.
(bi, S, T, M, I), Section, 1, 2, 5, 6, (Vo- 207)
- 87. *Picnomon acarna*** (L.) Cass.
(an, T, S, I, M), Section, 4, 6, (Vo-1419)
- 88. *Picris strigosa*** M. Bieb.
(pe, I, M, S, T), Section, 2, 5, 6, (Vo- 506)
- 89. *Pulicaria dysenterica*** (L.) Bernh.
(an, T, M), Section, 1, 2, 3, (Vo-33)
- 90. *Rhagadiolus stellatus*** (L.) Gaertn.
(an, I, T, M, S), Section, 3, (Vo- 434)
- 91. *Scolymus maculatus*** L.
(an, I, M), Section, 4, 5, 6, (Vo-780)
- 92. *Scorzonera lanata*** M.Bieb.
(pe, T, M, I, S), Section, 1, 2, 3, (Vo- 239)
- 93. *Scorzonera papposa*** DC.
(pe, S, M, T, I), Section, 6, (Vo-586)
- 94. *Senecio vernalis*** Waldst. & Kit.
(an, T, M, S), Section, 4, 5, 6, (Vo-114)
- 95. *Senecio vulgaris*** L.
(an, I, T, M), Section, 1, 2, 5, (Vo-98)
- 96. *Silybum marianum*** (L) Gaertn.
(an, S, M, I, T), Section, 1, 2, 5, 6, (Vo-92)
- 97. *Sonchus oleraceus*** (L.) L.
(an, T, I, S, M), Section, 1, 2, 3, 4, (Vo- 472)
- 98. *Stiptorhamphus tuberosus*** (Jacq.) Grossh.
(pe, T, M), Section, 1, (Vo- 1467)
- 99. *Taraxacum nevskii*** Juz.
(an, I, M, S, T), Section, 1, 3, 5, 6, (Vo- 80)
- 100. *Tragopogon dubius*** Scop.
(pe, T, M), Section, 1, 2, 3, 4, (Vo- 405)
- 101. *Xanthium strumarium*** L.
(pe, S, M, I, T), Section, 1, 3, 4, 6, (Vo- 18)
- 102. *Xeranthemum annuum*** L.
(pe, T, S, I, M), Section, 5, 6, (Vo- 1074)
- 103. *Zoega leptaurea*** L.
(an, S, M, T, I), Section, 1, 2, 3, 4, 5, 6, (Vo- 874)
- 17. BERBERIDACEAE**
- 104. *Bongardia chrysogonum*** (L.) Spach.

(pe, I, T, M), Section, 1, 2, 3, 4, 6, (Vo- 165)

16. BIEBERSTEINIACEAE

105. *Biebersteinia multifida* DC.

(pe, T, M, I), Section, 1, 3, (Vo- 241)

18. BORAGINACEAE

106. *Anchusa azurea* Mill.

(pe, T, M, S), Section, 1, 2, 3, 4, 6, (Vo- 251)

107. *Cynoglossum creticum* Mill.

(pe, S, T, M), Section, 1, 2, 3, (Vo- 958)

108. *Echium italicum* L.

(bi, I, M, T), Section, 2, 3, 4, 5, 6, (Vo- 831)

109. *Heliotropium lasiocarpum* Fisch. & C.A.Mey.

(an, T, I, M), Section, 1, 2, 3, 5, 6, (Vo- 20)

110. *Lithospermum arvense* L.

(an, T, M, I), Section, 1, 2, 3, (Vo- 651)

111. *Myosotis alpestris* F.W.Schmid.

(pe, T, M, I), Section, 1, 2, 3, 6, (Vo- 238)

112. *Omphalodes luciliae* Boiss.

(pe, I, M, T), Section, 1, 2, 3, 6, (Vo- 665)

113. *Onosma alborosea* Fisch. & C.A.Mey.

(pe, T, M), Section, 1, 2, 3, 4, 5, 6, (Vo- 57)

114. *Onosma aleppicum* Boiss.

(* , pe, I, M, T), Section, 4, (Vo-379)

115. *Onosma auriculatum* Aucher ex DC.

(* , bi, I, M, T), Section, 1, 3, 6, (Vo- 498)

116. *Onosma cardiostegium* Bornm.

(pe, T, M, I), Section, 1, 2, 3, (Vo-323, 324)

117. *Onosma rostellatum* Lehm.

(pe, I, M, T), Section, 1, 2, 3, 5, 6, (Vo-144)

118. *Symphytum kurdicum* Boiss. & Hausskn.

(pe, I, M, T), Section, 3, (Vo-346)

19. BRASSICACEAE

119. *Alyssum strigosum* Banks & Sol.

(an, S, M, T, I), Section, 1, 2, 3, 4, 5, (Vo-1357)

120. *Arabis aucheri* Boiss.

(pe, I, S, M, T), Section, 1, 3, 4, (Vo- 217)

121. *Biscutella didyma* L.

(an, I, S, M, T), Section, 1, 2, 5, (Vo-112)

122. *Brassica nigra* L.

(an, T, M, S, I), Section, 1, 2, 3, 4, 5, 6, (Vo- 260)

123. *Capsella bursa-pastoris* (L.) Medik.

(an, I, M, S, T), Section, 1, 2, 3, 4, 6, (Vo- 552)

124. *Clypeola jonthlaspi* L.

(an, T, I, M, S), Section, 1, 2, 4, 5, (Vo-1101)

125. *Eruca vesicaria* (L.) Cav.

(an, T, S, I, M), Section, 1, 3, 5, (Vo- 293)

126. *Erysimum repandum* L.

(an, T, M, I, S), Section, 1, 2, 3, 4, (Vo-303)

127. *Fibigia clypeata* (L.) Medic.

(pe, S, M, I, T), Section, 1, 3, (Vo- 650)

128. *Fibigia macrocarpa* Boiss.

(pe, I, S, M, T), Section, 1, 2, (Vo- 289)

129. *Hesperis kurdica* F. Dvorak & Hadac

(pe, T, I, M), Section, 1, 2, 4, 5, 6, (Vo- 662)

130. *Isatis cappadocica* Desv.

(an, I, S, T, M), Section, 1, 3, (Vo-797)

131. *Isatis lusitanica* L.

(an, S, T, M, I), Section, 1, 2, 4, (Vo-218)

132. *Isatis tinctoria* L.

(an, T, S, I, M), Section, 1, 2, 3, (Vo- 466)

133. *Lepidium darba* L.

(an, I, M, S, T), Section, 2, 3, 5, (Vo-798)

134. *Nasturtium officinale* R.Br.

(pe, S, T, M, I), Section, 1, 2, (Vo- 45)

135. *Sameraria stylophora* (Jaub. & Spach) Boiss.

(an, T, S, M, I), Section, 1, 2, 3, 4, 5, (Vo- 915)

136. *Sinapis arvensis* L.

(an, S, M, T, I) Section, 1, 2, 3, 5, (Vo- 69)

20. CAMPANULACEAE

137. *Campanula glomerata* L.

(an, S, T, M), Section, 1, 2, 3, (Vo- 787)

138. *Campanula propinqua* Fisch. & C.A.Mey.

(an, T, M, S), Section, 1, 5, 6, (Vo- 471)

139. *Campanula reuteriana* Boiss. & Balansa

(an, T, S, M), Section, 1, 2, 3, (Vo- 651)

21. CAPRIFOLIACEAE

140. *Cephalaria syriaca* (L.) Schard.

(an, S, M, T, I), Section, 1, 2, 3, 5, 6, (Vo- 1099)

141. *Lomelosia palaestina* (L.) Raf

(an, I, M, T), Section, 1, 2, 5, 6, (Vo- 932)

142. *Pterocephalus kurdicus* Vaill. ex Adans.

(Pe, T, I, M), Section, 1, 2, 5, 6, (Vo-707)

143. *Scabiosa palaestina* L.

(an, T, S, I, M), Section, 1, 2, 5, 6, (Vo- 377)

144. *Valerianella vesicaria* (L.) Moench.

(an, T, I, M), Section, 1, 2, 5, 6, (Vo- 408)

22. CARYOPHYLLACEAE

145. *Arenaria serpyllifolia* L.

(bi, I, T, S, M), Section, 1, 2, 3, (Vo-553)

146. *Cerastium dichotomum* L.

(an, S, M, T, I), Section, 1, 2, 3, (Vo- 788)

147. *Dianthus strictus* Banks & Sol.

(pe, T, M, I), Section, 1, 2, 3, 4, 5, (Vo- 32)

148. *Gypsophila polyclada* Fenzl ex Boiss.

(an, T, M), Section, 1, 2, 3, (Vo-1121)

149. *Scleranthus uncinatus* Schur

(an, I, T, M), Section, 1, 2, 3, (Vo- 823)

150. *Silene ampullata* Boiss.

(an, I, M, T), Section, 1, 3, (Vo- 282)

151. *Silene armeria* L.

(an, I, M, T), Section, 3, (Vo- 205)

152. *Silene colorata* Poir.

(* , an, I, M, T), Section, 2, (Vo- 717)

153. *Silene dichotoma* Ehrh.

(an, I, T, M), Section, 1, 2, (Vo-330)

154. *Vaccaria hispanica* Mill.

(an, S, M, I, T), Section, 1, 2, 5, 6, (Vo- 445)

23. CISTACEAE

155. *Helianthemum ledifolium* (L.) Mill.

(an, S, T, M, I), Section, 1, 2, 4, (Vo- 837)

24. COLCHICACEAE

156. *Colchicum persicum* Baker.

(pe, T, S, I, M), Section, 1, 2, 3, (Vo- 279)

25. CONVULVULACEAE

- 157. *Calystegia sepium* (L.) R.Br.**
(pe, T, S, M, I), Section, 5, (Vo-774)
- 158. *Convolvulus arvensis* L.**
(pe, I, M, T, S), Section, 1, 4, (Vo-525)
- 159. *Convolvulus stachydidifolius* L.**
(pe, T, S, M, I), Section, 2, 5, 5, (Vo-127)
- 26. CRASSULACEAE**
- 160. *Rosularia sempervivum* (Bieb.) Berger. subsp. kurdica Eggl.**
(pe, T, M), Section, 1, (Vo- 313)
- 161. *Sedum hispanicum* L.**
(pe, I, M, T), Section, 1, 2, 5, 6, (Vo- 747)
- 162. *Umbilicus horizontalis* (Guss.) DC.**
(pe, T, M, S), Section, 1, 2, 6, (Vo- 458)
- 27. CUCURBIACEAE**
- 163. *Bryonia multiflora* Boiss. & Heldr.**
(pe, S, T, I, M), Section, 2, 5, (Vo-224)
- 28. CUPRESSACEAE**
- 164. *Cupressus sempervirens* L.**
(Tr, I, M, T, S), Section, 1, 2, 6, (Vo-884)
- 165. *Thuja orientalis* (L.) Franco.**
(Tr, T, M, I), Section, 1, 2, 5, (Vo-883)
- 29. CYPERACEAE**
- 166. *Cyperus longus* L.**
(pe, S, M, T, I), Section, 1, 2, 3, 5, (Vo- 608)
- 167. *Cyperus rotundus* L.**
(pe, T, M, S, I), Section, 1, 4, 5, (Vo- 542)
- 30. EUPHORBIACEAE**
- 168. *Andrachne aspera* Spreng.**
(pe, T, M, I, S), Section, 1, 4, 6, (Vo-1104)
- 169. *Chrozophora tinctoria* (L.) Raf.**
(an, I, T, M, S), Section, 2, 5, 6, (Vo-571)
- 170. *Euphorbia aleppica* L.**
(an, I, T, M, S), Section, 1, 2, 5, 6, (Vo- 750)
- 171. *Euphorbia falacta* L.**
(an, S, T, I, M), Section, 1, 2, 4, (Vo- 495)
- 172. *Euphorbia helioscopia* L.**
(an, I, M, T, S), Section, 1, 2, 4, 5, (Vo- 88)
- 173. *Euphorbia macroclada* Boiss.**
(pe, T, I, M, S), Section, 1, 2, 3, 5, (Vo- 494)
- 174. *Euphorbia petiolata* Banks & Sol.**
(an, T, I, M, S), Section, 1, 2, 5, 6, (Vo- 702)
- 31. FABACEAE**
- 175. *Astragalus gossypinus* Fisch.**
(pe, I, M, T, S), Section, 1, 2, 6, (Vo- 318)
- 176. *Astragalus hamosus* L.**
(an, I, S, M, T), Section, 1, 2, 3, (Vo- 713)
- 177. *Astragalus lagurus* Willd.**
(pe, S, I, T, M), Section, 1, 2, (Vo- 1927)
- 178. *Astragalus Persicus* (DC.) Fisch. & C. A. Mey.**
(* , pe, T, M, S, I), Section, 1, 3, (Vo- 819)
- 179. *Astragalus spinosus* (Forssk.) Muschl.**
(pe, S, M, T), Section, 1, 2, 3, (Vo- 249)
- 180. *Colutea arborescens* L.**
(Sh, I, M, T), Section, 1, 2, (Vo- 1458)
- 181. *Hymenocarpus circinnatus* (L.) Savi**
(an, S, T, M, I), Section, 4, (Vo- 465)
- 182. *Lathyrus annus* L.**
(an, T, M, I), Section, 4, 5, 6, (Vo- 95)
- 183. *Lotus gebelia* Vent var. gebelia**
(an, T, M, I), Section, 4, 5, 6, (Vo- 504)
- 184. *Medicago constricta* Durieu.**
(an, S, T, M, I), Section, 1, 2, 5, 6, (Vo-185)
- 185. *Medicago lupulina* L.**
(an, T, M, S), Section, 5, 6, (Vo- 1020)
- 186. *Medicago minima* (L.) L.**
(an, T, M, S), Section, 1, 2, 4, (Vo- 481)
- 187. *Medicago orbicularis* (L.) Bartal.**
(an, I, M, S, T), Section, 3, 6, (Vo- 169)
- 188. *Medicago polymorpha* L.**
(an, T, S, M, I), Section, 1, 5, 6, (Vo- 459)
- 189. *Medicago radiata* L.**
(an, T, S, I, M), Section, 1, 5, (Vo- 706)
- 190. *Onobrychis caput-galli* (L.) Lam.**
(an, S, T, M, I), Section, 4, 5, (Vo- 1071)
- 191. *Onobrychis crista-galli* (L.) Lam.**
(an, S, M, I, T), Section, 1, 2, 3, 6, (Vo-1100)
- 192. *Ononis sicula* Guss.**
(an, I, T, S, M), Section, 1, 3, 4, (Vo-759)
- 193. *Ononis spinosa* L.**
(an, T, S, M, I), Section, 1, 3, 4, (Vo- 818)
- 194. *Pisum sativum* L.**
(an, S, M, I, T), Section, 1, 2, 3, 4, 5, 6, (Vo- 59)
- 195. *Prosopis farcta* (Banks & Sol.) J.F.Macbr.**
(pe, S, T, M, I), Section, 1, 2, 3, 4, 5, 6, (Vo- 16)
- 196. *Trifolium campestre* Schreb.**
(an, I, M, S, T), Section, 1, 2, 5, 6, (Vo- 724)
- 197. *Trifolium hirtum* L.**
(an, S, M, T), Section, 1, 2, 3, 4, 5, 6, (Vo- 749)
- 198. *Trifolium purpureum* Loisel.**
(an, I, T, M, S), Section, 1, 2, 3, 4, 5, (Vo- 470)
- 199. *Trifolium repens* L.**
(an, S, T, I, M), Section, 1, 2, 5, 6, (Vo- 149)
- 200. *Trifolium respupinatum* L.**
(an, T, S, M, I), Section, 1, 2, 5, 6, (Vo- 369)
- 201. *Trifolium stellatum* L.**
(an, S, M, T), Section, 1, 2, 5, 6, (Vo- 200)
- 202. *Trifolium subterraneum* L.**
(an, S, T, I, M), Section, 5, (Vo- 703)
- 203. *Trifolium tomentosum* L.**
(an, I, S, M, T), Section, 1, 2, 5, 6, (Vo- 939)
- 204. *Vicia michauxii* Spreng.**
(an, T, M, I, S), Section, 2, 5, 6, (Vo- 437)
- 205. *Vicia narbonensis* L.**
(an, S, T, M, I), Section, 1, 2, 3, 5, (Vo- 752)
- 206. *Vicia palaestina* Boiss.**
(an, S, M, I, T), Section, 1, 5, 6, (Vo- 146)
- 207. *Vicia sativa* L.**
(an, S, T, M, I), Section, 1, 2, 5, (Vo- 96)
- 208. *Vicia tenuifolia* Roth**
(an, S, T, M, I), Section, 1, 5, 6, (Vo- 487)
- 209. *Ziziphora capitata* L.**

(an, T, M, I), Section, 1, 2, 3, 4, (Vo- 582)

32. FAGACEAE

210. *Quercus aegilops* subsp. *brantii* (Lindl.)
(Tr, S, T, M, I), Section, 1, 2, 3, 4, 5, 6, (Vo- 6)

211. *Quercus infectoria* Oliv.
(Tr, I, M, T, S), Section, 1, 2, 3, 4, 6, (Vo- 122)

33. GENTIANACEAE

212. *Gentiana olivieri* Griset.
(an, T, M, S), Section, 1, 2, 5, (Vo- 723)

34. GERANIACEAE

213. *Erodium malacoides* (L.) L Her.
(an, T, M), Section, 1, 2, (Vo- 412)

214. *Geranium dissectum* L.
(an, T, M, S), Section, 1, 2, (Vo- 541)

215. *Geranium tuberosum* L.
(pe, S, T, M), Section, 3, (Vo- 220)

35. HYPERICACEAE

216. *Hypericum scabrum* L.
(pe, I, M), Section, 1, 2, 5, 6, (Vo- 822)

217. *Hypericum triquetrifolium* Turra. *Farsetia* nov.
(pe, S, M, T, I), Section, 1, 2, 4, 6, (Vo- 790)

36. IRIDACEAE

218. *Crocus cancellatus* Herb.
(pe, S, T, M, I), Section, 1, 3, (Vo- 60)

219. *Gladiolus italicus* Mill.
(pe, I, M, T, S), Section, 1, 2, 5, 6, (Vo- 407)

220. *Iris reticulata* M.Bieb.
(pe, T, M, I), Section, 5, (Vo- 213)

37. IXIOLIRIACEAE

221. *Ixiolirion tataricum* (pall) J.A & J.H Schultes
(pe, S, T, M, I), Section, 1, 2, 3, 6, (Vo- 280)

38. JUNCACEAE

222. *Juncus inflexus* L.
(pe, I, M, S, T), Section, 1, 4, 5, (Vo- 537)

39. LAMIACEAE

223. *Ajuga chamaepitys* (L.) Schreb.
(Pe, I, M), Section, 3, 6, (Vo- 413)

224. *Ballota nigra* L.
(Pe, I, M), Section, 1, 2, 3, 4, (Vo- 1136)

225. *Clinopodium vulgare* L.
(Pe, T, M, I), Section, 1, 3, (Vo- 900)

226. *Eremostachys laevigata* Bunge.
(pe, T, I, M), Section, 1, 3, 4, (Vo- 305)

227. *Lamium amplexicaule* L.
(an, S, M, T, I), Section, 1, 3, 4, 5, 6, (Vo- 41)

228. *Marrubium cuneatum* Banks & Sol.
(pe, T, M, I), Section, 1, 2, 3, 5, (Vo- 714)

229. *Marrubium vulgare* L.
(pe, T, M, I), Section, 2, 5, 6, (Vo- 336)

230. *Mentha longifolia* (L.) Huds.
(pe, S, M, I), Section, 1, 2, 5, 6, (Vo- 11)

231. *Micromeria myrtifolia* Boiss. & Hohen.
(an, T, M, S, I), Section, 1, 2, 3, (Vo-725)

232. *Nepeta racemosa* Lam.
(pe, I, T, M), Section, 1, 2, 5, 6, (Vo-1132)

233. *Phlomis bruguieri* Desf.
(pe, I, T, M), Section, 1, 5, (Vo- 880)

234. *Phlomis kurdica* Rech.F.
(pe, T, M, I, S), Section, 1, 2, 3, 4, 5, 6, (Vo- 67)

235. *Phlomis lanceolata* Boiss. & Hohen.
(pe, I, M, T, S), Section, 1, 2, 3, (Vo-1046)

236. *Phlomis rigida* Labill.
(pe, T, M, I, S), Section, 1, 2, 3, 4, 5, 6, (Vo- 415)

237. *Salvia candidissima* Vahl.
(pe, I, M, T), Section, 1, 3, (Vo- 858)

238. *Salvia indica* L.
(pe, T, M, I), Section, 1, 2, 3, (Vo- 103)

239. *Salvia multicaulis* Vahl.
(pe, T, M, I), Section, 1, 2, 3, 5, (Vo- 294)

240. *Salvia palaestina* Benth.
(pe, I, M, T), Section, 4, (Vo- 395)

241. *Salvia trichoclada* Benth.
(pe, T, M, I), Section, 1, 2, 3, 4, (Vo- 489)

242. *Scutellaria albida* L.
(pe, S, M, I, T), Section, 3, (Vo- 1118)

243. *Scutellaria pinnatifida* A. Ham.
(pe, T, S, M, I), Section, 1, 2, 3, (Vo- 749)

244. *Stachys annua* (L.) L.
(pe, T, M, I), Section, 1, 2, 3, 6, (Vo- 503)

245. *Stachys lavandulifolia* Vahl.
(pe, I, T, M), Section, 2, 3, (Vo- 326)

246. *Teucrium polium* L.
(an, T, I, M, S), Section, 1, 2, 3, (Vo- 663)

247. *Thymus* sp.
(pe, T, M, I), Section, 1, 3, (Vo- 170)

248. *Thymus eriocalyx* (Ronniger) Jalas
(pe, T, M, I), Section, 2, 6, (Vo- 1921)

249. *Vitex agnus-castus* L.
(Sh, S, M, I, T), Section, 1, 2, 3, (Vo- 2).

250. *Ziziphora clinopodioides* Lam.
(an, T, M, I, S), Section, 1, 3, (Vo- 821)

40. LILIACEAE

251. *Fritillaria straussii* Bornm.
(pe, I, M, T), Section, 1, 2, 3, (Vo- 211)

252. *Tulipa systola* Stapf.
(pe, S, M, T, I), Section, 3, 4, (Vo- 52)

41. LYTHRACEAE

253. *Lythrum salicaria* L.
(pe, T, S, I, M), Section, 5, (Vo- 14)

42. MALVACEAE

254. *Alcea kurdica* Alef.
(pe, S, M, T, I), Section, 1, 2, 3, 4, 5, 6, (Vo- 82)

255. *Alcea sulphurea* (Boiss. & Hohen.) Alef.
(pe, M, I, T), Section, 1, 4, (Vo- 449)

256. *Corchorus olitorius* L.
(an, M), Section, 3, (Vo- 1914)

257. *Malva neglecta* Wallr.
(pe, T, S, M, I), Section, 1, 2, 3, 4, 5, 6, (Vo- 36)

43. MARTYNIACEAE

258. *Ibicella lutea* (Lindl.) Van Eselt.
(* , an, M, I, T), Section, 5, (Vo- 13)

44. MORACEAE

259. *Ficus carica* L.
(Tr, S, T, I, M), Section, 1, 2, 5, (Vo-150)

- 260. *Morus alba* L.**
(Tr, T, S, I, M), Section, 1, 2, 3, 4, 5, 6, (Vo- 397)
- 45. ONAGRACEAE**
- 261. *Epilobium hirsutum* L.**
(pe, S, T, I), Section, 1, 2, 6, (Vo- 929)
- 46. ORCHIDACEAE**
- 262. *Anacamptis laxiflora* (Lam.) R.M.Bateman,**
Pridgeon & M.W.Chase
(pe, T, M), Section, 1, (Vo- 848)
- 263. *Himantoglossum comperianum* (Steven) P.**
Delforge
(pe, T, M, I, S), Section, 1, 3, (Vo- 575)
- 264. *Orchis collina* Banks & Sol. Ex Russell.**
(pe, S, T, I, M), Section, 1, 3, (Vo- 838)
- 47. OROBANCHACEAE**
- 265. *Orobanche kurdica* Boiss. & Hausskn.**
(an, T, I, M), Section, 1, 2, (Vo- 486)
- 266. *Orobanche ramosa* L.**
(an, I, T, M), Section, 1, 3, (Vo- 266)
- 48. PAPAVERACEAE**
- 267. *Fumaria parviflora* Lam.**
(pe, S, T, I, M), Section, 1, 2, 3, (Vo- 577)
- 268. *Papaver argemone* L.**
(an, I, T, M), Section, 1, 2, 3, 4, 5, 6, (Vo- 523)
- 269. *Papaver rhoeas* L.**
(an, S, T, M), Section, 1, 2, 3, 4, (Vo- 255)
- 49. PLANTAGINACEAE**
- 270. *Kickxia elatine* (L.) Dumort.**
(pe, S, T, M), Section, 1, 3, (Vo-711)
- 271. *Linaria kurdica* Boiss. & Hohen.**
(pe, I, T, M), Section, 1, 2, 3, (Vo- 820)
- 272. *Plantago afra* L.**
(an, T, M, I, S), Section, 1, 2, 3, (Vo- 719)
- 273. *Plantago lanceolata* L.**
(pe, S, T, M, I), Section, 4, (Vo- 382)
- 274. *Plantago major* L.**
(an, T, M, I, S), Section, 1, 2, 3, 4, 5, 6, (Vo- 505)
- 275. *Veronica anagallis aquatic* L.**
(pe, I, T, M), Section, 1, 2, 3, 4, (Vo -189)
- 276. *Veronica orientalis* Miller**
(an, T, M, I), Section, 1, 3, (Vo- 423)
- 277. *Veronica persica* L.**
(an, S, T, I, M), Section, 1, 2, 3, (Vo- 800)
- 50. PLUMBAGINACEAE**
- 278. *Acantholimon caryophyllaceum* Boiss.**
(pe, S, T, I, M), Section, 2, 3, (Vo- 930)
- 51. POACEAE**
- 279. *Aegilops triuncialis* L.**
(an, I, T, M, S), Section, 1, 2, 3, 4, (Vo- 544)
- 280. *Aegilops umbellata* Zhuk.**
(an, I, T, S, M), Section, 1, 2, 3, 4, (Vo- 1192)
- 281. *Alopecurus myosuroides* Huds.**
(an, T, I, M, S), Section, 1, 2, 4, (Vo- 1112)
- 282. *Avena eriantha* Dur**
(an, I, T, S, M), Section, 1, 2, 3, (Vo- 439)
- 283. *Avena fatua* L.**
(an, T, S, I, M), Section, 1, 2, 3, 4, (Vo- 359, 378)
- 284. *Brachypodium sylvaticum* (Huds.) P. Beauv.**
(pe, T, S, I, M), Section, 5, (Vo- 832)
- 285. *Bromus lanceolatus* Roth.**
(an, S, T, M, I), Section, 1, 2, 4, (Vo- 644)
- 286. *Bromus tomentellus* Boiss.**
(pe, T, S, M, I), Section, 1, 3, (Vo- 1922)
- 287. *Cenchrus ciliaris* L.**
(pe, I, T, M, S), Section, 1, 2, 4, (Vo- 721)
- 288. *Cortaderia selloana* (Schult.) Asch. & Graebn.**
(pe, S, T, I, M), Section, 1, 2, (Vo- 1114)
- 289. *Cynodon dactylon* (L.) Pers.**
(pe, T, S, I, M), Section, 1, 2, 3, 4, 5, 6, (Vo- 543)
- 290. *Dactylis glomerata* L.**
(pe, I, T, M, S), Section, 1, 2, 3, (Vo- 827)
- 291. *Digitaria sanguinalis* (L.) Scop.**
(pe, S, T, I, M), Section, 1, 2, 3, 6, (Vo- 1421)
- 292. *Echinochloa crus-galli* (L.) Beauv.**
(an, I, T, M, S), Section, 3, (Vo- 24)
- 293. *Elymus repens* (L.) Gould**
(an, S, M, T, I), Section, 1, (Vo- 720)
- 294. *Hordeum bulbosum* L.**
(Pe, S, T, M, I), Section, 1, 4, (Vo-354)
- 295. *Imperata cylindrica* (L.) P. Beauv.**
(Pe, T, I, S, M), Section, 1, 5, (Vo- 870)
- 296. *Lolium perenne* L.**
(an, T, M), Section, 3, (Vo-1010)
- 297. *Melica persica* L.**
(an, T, M), Section, 5, (Vo-1243)
- 298. *Phragmites australis* (Cav.) Trin.ex Steud.**
(pe, S, I, M, T), Section, 5, (Vo- 23)
- 299. *Poa bulbosa* L.**
(pe, S, T, M, I), Section, 5, 6, (Vo- 664)
- 300. *Polypogon monspeliensis* (L.) Desf.**
(pe, T, I, S, M), Section, 1, 2, (Vo- 545)
- 301. *Sorghum halepense* (L.) Pers**
(pe, S, I, M, T), Section, 5, 6, (Vo- 568)
- 52. POLYGONACEAE**
- 302. *Persicaria maculosa* Gray.**
(an, I, M, T), Section, 1, 2, 3, (Vo-550)
- 303. *Polygonum aviculare* L.**
(an, T, I, M), Section, 1, 2, 3, (Vo- 549)
- 304. *Polygonum cognatum* Meisn**
(an, I, M, T), Section, 1, 3, (Vo-1111)
- 305. *Rheum ribes* L.**
(pe, T, S, I, M), Section, 2, 3, (Vo-162)
- 306. *Rumex crispus* L.**
(pe, T, I, M), Section, 1, 2, 3, (Vo-100)
- 307. *Rumex dentatus* L.**
(pe, S, I, M), Section, 1, 3, 4, (Vo- 861)
- 308. *Rumex scutatus* L.**
(pe, T, I, M), Section, 1, 3, 4, (Vo- 844)
- 53. PRIMULACEAE**
- 309. *Anagallis arvensis* L.**
(an, S, I, M, T), Section, 1, 3, (Vo- 152)
- 310. *Dionysia odora* Fenzi.**

(pe, I, M), Section, 2, (Vo-319)

311. *Lysimachia linum-stellatum* L.

(an, S, I, T, M), Section, 1, 5, (Vo- 1424)

54. RANUNCULACEAE

312. *Adonis aestivalis* L.

(an, S, I, T, M), Section, 1, 2, 3, (Vo- 55)

313. *Anemone coronaria* L.

(pe, I, T, M, S), Section, 1, 2, 3, 4, 5, 6, (Vo- 50, 51)

314. *Anemone microcarpa* DC.

(pe, T, I, S, M), Section, 1, 2, 5, (Vo- 55)

315. *Ceratocephala falcata* (Linnaeus) Persoon

(an, T, I, M, S), Section, 5, (Vo- 1109)

316. *Delphinium peregrinum* L.

(an, S, I, M, T), Section, 1, 2, (Vo- 335)

317. *Nigella arvensis* L.

(an, T, I, M, S), Section, 1, (Vo- 1097)

318. *Ranunculus arvensis* L.

(an, I, T, M, S), Section, 1, 2, 3, (Vo- 228)

319. *Ranunculus asiaticus* L.

(pe, S, I, M, T), Section, 1, 5, (Vo- 125)

320. *Ranunculus bulbiferus* Boiss. & Hohen.

(* , pe, T, I, S, M), Section, 1, 2, (Vo- 502)

321. *Thalictrum sultanabadense* stapf.

(pe, T, M), Section, 1, 2, 3, (Vo- 237)

55. RHAMNACEAE

322. *Paliurus spina-christi* Mill.

(Sh, I, T, S, M), Section, 4, 5, 6, (Vo- 451)

56. ROSACEAE

323. *Crataegus azarolus* L.

(Tr, S, T, I, M) Section, 2, 3, 4, 6, (Vo-1)

324. *Crataegus monogyna* L.

(Tr, S, T, M, I) Section, 2, 3, (Vo- 320)

325. *Cydonia oblonga* Mill

(Tr, T, I, S, M) Section, 5, (Vo- 511)

326. *Prunus amygdalus* L.

(Tr, S, I, M, T), Section, 1, 2, 5, (Vo- 401)

327. *Prunus arabica* (Olive.) Meikle.

(Sh, I, T, S, M), Section, 1, 2, (Vo- 151)

328. *Prunus argentea* (Lam.) Rehd.

(Sh, S, T, M, I), Section, 1, 2, 4, (Vo- 476)

329. *Prunus microcarpa* C.A.Mey.

(Sh, T, I, S, M), Section, 1, 2, 3, 4, 5, 6, (Vo-3)

330. *Pyrus syriaca* Boiss.

(Tr, T, S, I, M), Section, 3, 5, (Vo-10)

331. *Rosa canina* L.

(Sh, T, I, M), Section, 1, 4, 5, (Vo- 421)

332. *Rubus sancta* Schreb.

(Sh, I, M, S), Section, 1, 2, 3, 5, (Vo- 9)

57. RUBIACEAE

333. *Asperula arvensis* L.

(an, T, I, M), Section, 5, 6, (Vo-507)

334. *Asperula glomerata* (M. Bieb.) Griseb.

(pe, T, I, M), Section, 1, 6, (Vo- 655)

335. *Cruciata taurica* (Pall. Ex Willd.) Ehrend.

(an, T, I, M, S), Section, 1, 2, 3, (Vo- 292)

336. *Galium aparine* L.

(an, I, T, S, M), Section, 1, 2, 3, 4, 5, (Vo-208)

337. *Galium tricornutum* Dandy.

(an, S, T, I, M), Section, 1, 2, 3, (Vo-722)

338. *Sherardia arvensis* L.

(an, T, S, M, I), Section, 5, (Vo-704)

339. *Theligonium cynocrambe* L.

(an, S, M, T, I), Section, 1, 4, (Vo- 709)

58. SALICACEAE

340. *Salix aegyptiaca* L.

(Tr, T, I, S, M), Section, 1, 5, (Vo-316)

341. *Salix purpurea* L.

(Tr, I, S, M, T), Section, 5, (Vo-866)

59. SAXIFRAGACEAE

342. *Saxifraga sibirica* L.

(pe, T, M), Section, 1, (Vo- 654)

60. SCROPHULARIACEAE

343. *Verbascum alceoides* Boiss. & Hausskn.

(pe, I, M), Section, 1, 2, (Vo-147)

344. *Verbascum orientale* (L.) All.

(pe, I, M, T), Section, 1, 2, 3, (Vo- 463)

345. *Verbascum sinuatum* L.

(bi, S, I, M, T), Section, 1, 4, (Vo- 442)

61. SOLANACEAE

346. *Datura stramonium* L.

(pe, I, S, T, M), Section, 1, (Vo- 1063)

347. *Physalis angulata* L.

(an, I, T, M), Section, 1, 2, 3, (Vo- 22)

62. TYPHACEAE

348. *Typha lugdunensis* P. Chab.

(pe, I, T, M), Section, 5, 6, (Vo-15)

63. ULMACEAE

349. *Celtis tournefortii* Lam.

(Tr, S, T, M, I), Section, 1, 2, 3, (Vo- 658)

64. URTICACEAE

350. *Urtica dioica* L.

(an, S, T, I, M), Section, 1, 3, (Vo- 322)

65. ZYGOPHYLLACEAE

351. *Tribulus terrestris* L.

(an, S, T, M), Section, 5, (Vo- 1911)

5. CONCLUSION

Investigation of floristic habitat composition is important for continuous environmental study, management and protection of plants. Detailed data can shed light on less costly conservation, as resources available for conservation of species and habitats are minimal. Plant biodiversity, which is evaluated according to altitude steps in the study, is also an important tool for conservation and management actions for species and ecosystems.

This study reveals a considerably higher number of plant species for the Makok Mountain. Most of the plants are herbaceous, with a total number of 322 plant species out of 351 plant species. There are 10 species of shrubs, and trees are 16 species and ferns 3 plant species, pteridophytes are at least 3 species. The duration of species was as follows: Some of the 155 plant species were annual, with 10 species are biennial, and 157 species are perennial, and this shows that the dominance of plant species are perennial. These

numbers and rates make it clear that most of the species in this area are distributed geographically in the surrounding countries and in other districts of Iraq. Most of the plants in this surveyed area are located in the Gullan and Bardanga villages.

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7. APPENDIX: Vascular plants in Surveyed Area.



Acanthus dioscoridis L.



Tulipa systola Stapf.



Dionysia odora Fenzl



Astragalus spinosus L.



Crataegus azarolus L.



Centaurea solstitialis L.



Fritillaria straussii Bornm.



Rheum ribes L.



Vicia tenuifolia Roth.



Orobanche ramosa L.



Onosma auriculatum Aucher ex DC.



Acantholimon caryophyllaceum Boiss.